REMARKS

No claims have been amended, added, or canceled in the present response. Please note that the Examiner listed claim 23 as pending in the application. However, claim 23 was cancelled in the Amendment filed November 1, 2004. Thus, claims 1-6, 9-22, 24-29, 32-42, 44-63, 65, 66, 68, 70 and 71 remain pending in the application. Reconsideration is respectfully requested in light of the following remarks.

Section 102(b) Rejection:

The Examiner rejected claims 1, 9, 16, 18-25, 32, 37-39 and 41-46 under 35 U.S.C. § 102(b) as being anticipated by Annapareddy et al. (U.S. Patent 5,602,839) (hereinafter "Annapareddy"). Applicant respectfully traverses this rejection in light of the following remarks.

Regarding claim 1, Annapareddy fails to disclose encoding the routing directive in the message, wherein the routing directive describes the route and comprises at least one segment, wherein *each segment comprises a direction component and a distance component.* The Examiner's cites Fig. 4, Fig. 10, and column 6, lines 9-27 of Annapareddy. However, none of the Examiner's cited passages mention a routing directing segment including a direction component and a distance component. Figure 4 and column 6, lines 9-27 describe a message header that contains group and local node addresses and a deflection counter. None of these components of the message header correspond to a *direction* for a routing segment or to a *distance* for a routing segment. The address fields refer explicitly to source and destination node addresses, not to a direction to take on the route from the source node to the destination node. Also, the deflection counter does not specify the distance to take in a specified direction. Instead, it decrements whenever a most-preferred path is not taken. If this counter decrements to zero before a message is delivered, the message delivery is terminated, thus preventing messages from endless traveling in the network without getting delivered (column 4, lines 14-30).

Figure 10, also cited by the Examiner, depicts a routing table containing preferred routes for sending messages between gateway nodes. Each entry specifies an absolute address for source node and an absolute address for a destination node (column 9, lines 24-62), not a relative direction in which to travel from a source node toward a destination node. Therefore, the entries do not correspond to routing directive segments comprising *a direction component and a distance component*, as the Examiner contends. In fact, Annapareddy teaches away from a routing method using direction and distance components at column 2, lines 10-15 and 24-26, describing drawbacks to techniques that route messages in X and Y directions based on the difference between source and destination addresses in a mesh network. Annapareddy notes that such routing techniques are not transferable to other network topologies. **Annapareddy specifically notes that his system is in contrast to routing techniques that route messages in X and Y directions (column 2, lines 24-26).** Nowhere does Annapareddy describe a routing directive segment comprising a direction component and a distance component.

Annapareddy also fails to disclose decrementing the distance component for a current segment of the routing directive. The Examiner cites the deflection counter of Fig. 4 as implementing this feature. However, as discussed above and as described in the Examiner's own citations (column 4, lines 14-20 and column 11, lines 45-50), the deflection counter is not keeping track of the distance of a preferred routing segment. In contrast, it keeps track of deflected segments, those following a path other than the most-preferred path, in order to prevent endless traveling on the network.

Therefore, for at least the reasons above, the rejection of claim 1 is not supported by the prior art and removal thereof is respectfully requested. Similar remarks as those made above regarding claim 1 also apply to claims 22 and 39.

Regarding claim 18, Annapareddy fails to disclose wherein each direction component comprises a direction relative to a routing direction the message was traveling in when received. The Examiner cites Figures 5, 6, 10 and 11 which illustrate

Annapareddy's level-1 and level-2 routing tables. However, these figures depict routing tables containing preferred routes for sending messages between various gateway nodes and local nodes using absolute addresses for source and destinations nodes (see, column 9, lines 24-62). Annapareddy does not use direction components in his routing tables. In fact, as noted above, Annapareddy teaches away from routing directives using direction components (see, column 2, lines 6-30). Thus, the rejection of claim 18 is not supported by the prior art and removal thereof is respectfully requested.

Regarding claim 21, Annapareddy fails to disclose a destination node configured to communicate with a storage device, wherein the storage device comprises a disk drive. The Examiner cites figures 3 and 9 of Annapareddy. However, the cited figures do not teach a node configured to communicate with a disk drive. Instead, the cited figures teach that Annapareddy's nodes include system memory, such as DRAM, which is clearly different from a disk drive. Nowhere does Annapareddy mention anything about a destination node configured to communicate with a disk drive. Thus, the rejection of claim 21 is not supported by the prior art and removal thereof is respectfully requested. Similar remarks apply to claims 38 and 42.

In regards to claim 24, contrary to the Examiner's assertion, Annapareddy fails to disclose that a node is configured to communicate with a device on a device port, where the device is configured to select a route, encode a routing directive in the message and communicate the message to the node on the device port, when the node is the sending node. The Examiner cites column 5, line 60 – column 6, line 8. However, However, the Examiner's citation merely describes the structure of a typical local node 100 of network 50, which consists of a processor, a memory containing two levels of routing tables, and some I/O channels. Annapareddy does not mention, either at the Examiner's cited portion or elsewhere, a sending node communicating with a device on a device port, where the device is configured to select a route, encode a routing directive in the message and communicate the message to the node on the device port. Moreover, Annapareddy teaches that the processor within each node selects the route for message delivery using local routing tables (see, FIG. 7; column 6, lines 28-40; and column 7, lines 43-65).

Thus, not only does Annapareddy fail to teach a sending node communicating with a device that selects a route and encodes a routing directive in a message, Annapareddy actually teaches away from a sending node communicating with such a device to select a route and encode a routing directive in a message. For at least the reasons above, the rejection of claim 24 is not supported by the prior art and removal thereof is respectfully requested.

Section 103(a) Rejections:

The Examiner rejected claims 2-6, 17 and 26-29 under 35 U.S.C. § 103(a) as being unpatentable over Annapareddy in view of Nugent (U.S. Patent 5,175,733). Applicants respectfully traverse this rejection for at least the reasons presented below.

Regarding claim 2, Annapareddy in view of Nugent fails to teach or suggest where selecting an output port comprises if, after decrementing the distance component for a current segment of the routing directive, the distance component for the current segment is greater than zero, selecting the output port corresponding to a same routing direction in which the message was traveling when received and if, after said decrementing, the distance component of the current segment is zero, selecting the output port corresponding to the direction component of the current segment. The Examiner admits that Annapareddy does not teach selecting the output port based upon the direction component and upon whether or not decrementing a distance component results in a distance component of zero or not. The Examiner relies upon Nugent, citing claims FIG. 8 and column 14, line 1 – column 15, line 14.

The Examiner contends that it would have been obvious to a person of ordinary skill in the art to employ the teachings of Nugent within the system of Annapareddy because decrementing the directional component to zero allows directional limits to be set thereby triggering a change in directions such as from X-direction to Y or Z-direction. However, Annapareddy does not use directional or distance components in his routing scheme. Instead, Annapareddy relies upon absolute node addresses for source and

destination nodes (Annapareddy, column 2, lines 60 – 67; column 6, lines 9-27). It would not make sense to modify Annapareddy to include the distance and direction based routing system of Nugent. Furthermore, as noted above, Annapareddy teaches away from using direction and distance components in a routing directive. Thus, modifying Annapareddy to use the distance and directional components of Nugent would render the resultant system unsatisfactory for its intended purpose. As noted above, Annapareddy specifically teaches that his absolute address based routing scheme is intended to be independent of any network topology and further teaches that using distance and directional components to specify a route renders the route dependent upon the specific network topology (Annapareddy, column 2, lines 6-31).

Therefore, for at least the reasons above, the rejection of claim 2 is not supported by the prior art and removal thereof is respectfully requested. Similar remarks apply to claims 5 and 26.

Regarding claim 6, Annapareddy in view of Nugent fails to teach of suggest selecting the corresponding output port if the direction component for the current segment specifies a routing direction; and selecting a device port if the direction component for the current segment specifies that the subsequent node is the destination for the message, contrary to the Examiner's contention. The Examiner cites column 7, lines 53-56 and column 9, lines 1-23 of Annapareddy. However, these portions of Annapareddy fail to mention anything about selecting between an output port and a device port dependent upon the direction component of the current segment. Instead, they describe that routing is complete when a message destination node address equals the current local node address and that various I/O channels connect nodes in the network. The cited passages do not mention device ports at all. Nugent is not relied upon by the Examiner to teach anything about selecting an output port or a device port according to whether the direction component for the current routing directive segment specifies a routing direction or that the subsequent node is the destination node. Therefore, neither Annapareddy nor Nugent, nor the combination of the two, teaches or suggests selecting between an output port and a device port dependent on the direction

component of a routing segment. Thus, for at least the reasons above, the rejection of claim 6 is not supported by the prior art and removal thereof is respectfully requested. Similar remarks apply to claims 17 and 29.

The Examiner rejected claims 10-13, 33-35 and 47-52 35 U.S.C. § 103(a) as being unpatentable over Annapareddy in view of Walker et al. (U.S. Patent 5,613,069) (hereinafter "Walker"). Applicants respectfully traverse this rejection for at least the following reasons.

Regarding claim 10, in contrast to the Examiner's assertion, Annapareddy in view of Walker fails to teach or suggest encoding a return routing directive in the message, identifying a return route from the destination node to the sending node, where the return routing directive describes the return route and comprises at least one segment, and where each segment comprises a direction component and a distance component.

The Examiner contends that Annapareddy uses routing directive segments that include direction and distance components. However, as discussed above regarding claim 1, the message header of Annapareddy does not comprise distance and direction components, but instead uses absolute addresses of the sending and destination nodes.

The Examiner relies upon Walker to teach identifying a return route from the destination node to the sending node and encoding a return routing directive in the message. However, the return directive in Walker is based on independent routelets that define an absolute switching path that depends only on the hardware configuration of the node (col. 7, lines 24-20). The routelet-based mechanism of Walker specifically does not use direction and distance components. It would not make sense to apply the routelet-based return route encoding of Walker to the routing mechanism of Annapareddy.

Thus, since Annapareddy and Walker, either singly or in combination, fail to teach or suggest encoding a return routing directive comprising segments that include

direction and distance components. For at least the reasons above, the rejection of claim 10 is not supported by the prior art and removal thereof is respectfully requested. Similar remarks apply to claim 33.

The Examiner rejected claims 53-62, 68 and 70 under 35 U.S.C. § 103(a) as being unpatentable over Flaig, et al (U.S. Patent (5,105,424) (hereinafter "Flaig") in view of Walker. Applicant respectfully traverses this rejection for at least the reasons presented below.

Regarding claim 53, Flaig in view of Walker teaches fails to teach or suggest identifying a return route from the destination node to the sending node and encoding a return routing directive in the message, wherein the message includes both the routing directive and the return directive when sent from the initial sending node, in contrast to the Examiner's assertion.

The Examiner admits that Flaig does not teach encoding a return routing directive in the message. The Examiner refers to Walker in regard to this feature of claim 53. However, Walker specifically states that the message is initially sent without a return directive ("routing trailer is null"). In Walker, the return directive is dynamically generated only after the message has been sent from the initial sending node. *See*, Walker – col. 8, lines 15-24. Therefore, Walker specifically does not teach or suggest that the message includes both the routing directive and the return routing directive when sent from the initial sending node, as is recited in claim 53.

In response, the Examiner argues that Walker's describes that when a packet "enters the network, ... the routing trailer is null" is not equivalent to "when sent from the initial sending node" as recited in the claim. The Examiner further cites column 7, lines 62-64 of Walker and refers to the fact that Walker's packet structure includes a routing trailer that describes where the packet has come from. However, the Examiner's own citations (above, and column 5, lines 20-25) clearly describe that a packet trailer is

dynamically generated and records the return route as the packet flows through the network. Thus, it cannot be included in the message when sent from the initial sending node. Walker's statement that when a packet enters the network the routing trailer is null clearly indicates that Walker does not encode a routine routing directive describing a return route from the destination node to the sending node in the message. As noted above, Walker very clearly describes building the return route as the message travels through the network.

Furthermore, the Examiner's argument that Walker's statement that a routing trailer is null when a packet enters the network is not equivalent to "when sent from the initial sending node" is irrelevant to the fact that Walker's system builds the return routing directive as the message progresses through the network (Walker, column 5, lines 20-25, and column 8, lines 15-25). Thus, Walker fails to teach or suggest encoding a routine routing directive describing a return route from the destination node to the sending node in the message wherein the message includes both the routing directive and the return routing directive when sent from the initial sending node.

Therefore, Walker clearly fails to overcome the deficiencies of Flaig. Thus, the combination of Flaig in view of Walker also fails to teach or suggest encoding a routine routing directive describing a return route from the destination node to the sending node in the message wherein the message includes both the routing directive and the return routing directive when sent from the initial sending node, as recited in claim 53.

For at least the reasons above, the rejection of claim 53 is not supported by the prior art and removal thereof is respectfully requested. Similar remarks as those above regarding claim 53 also apply to claims 56 and 59.

In regard to claim 68, Flaig in view of Walker does not teach or suggest incrementally encoding a return routing directive describing a return route from the destination node to the source node in the message, wherein the return routing directive describes a return route from the destination node to the sending node and comprises at

least one segment, and wherein each segment comprises a direction component and a distance component. The Examiner relies upon Walker to incrementally encode such a return routing directive. However, the return directive in Walker is based on independent routelets that define an absolute switching path (Walker – col. 7, lines 24-20. The routelet-based mechanism of Walker specifically does not use direction and distance components. As Flaig uses a completely different method of routing directives, it would not make sense to apply the routelet-based return route encoding of Walker to the routing mechanism of Flaig. Therefore, the combination of Flaig and Walker would not result in a system that included a return routing directive that uses distance and direction components. Applicants note that the Examiner has failed to respond to the above argument when presented previously.

Furthermore, Flaig in view of Walker does not teach or suggest a return routing directive configured to be used to return an error message to the source node if a routing error is encountered. The Examiner cites column 2, line 42-44 where Walker states that detection of errors and re-transmission of data are mandatory in almost all computer applications. In the Response to Arguments section, the Examiner reiterates his assertion that this one statement in Walker suggests "returning an error message". However, a simple statement that applications detect errors and re-transmit data does not imply the specific limitation of incrementally encoding a return routing directive configured to be used to return an error message to the source node if a routing error is encountered.

Furthermore, the portion cited by the Examiner is from the background section of Walker's disclosure and does not refer to the rest of Walker's teachings. In fact, Walker specifically states that his system "does not handle error detection and correction" (column 5, lines 32-33). Thus, **Walker teaches away** from error detection and correction.

Thus, the rejection of claim 68 is not supported by the prior art and removal thereof is respectfully requested.

The Examiner rejected claims 63, 65 and 66 under 35 U.S.C. § 103(a) as being unpatentable over Flaig in view of Walker and Nugent. Applicant respectfully traverses this rejection for at least the following reasons.

Regarding claim 63, Flaig in view of Walker in further view of Nugent fails to teach or suggest decrementing the distance component for a current segment of the routing directive, wherein said incrementally encoding comprises incrementing the distance component for a current segment of the return routing directive and wherein, if after said decrementing the distance component for the current segment of the routing directive is zero, the method further comprises modifying the direction component of a current segment of the return routing directive and adding a new segment to the return routing directive so that the new segment becomes the current segment of the return routing directive when the message is sent on the selected output port, in contrast to the Examiner's assertion.

The Examiner admits that Flaig and Walker fail to teach or suggest incrementally encoding a return routing directive as recited in claim 63 and relies upon Nugent. The Examiner refers to the citing of Nugent in the rejections of claim 2 and 3. However, claims 2 and 3 recite very different limitations than claim 63. The portions of Nugent cited by the Examiner in the rejections of claims 2 and 3, namely FIG. 8 and column 14 line 1- column 15, line 14, refer only to decrementing portions of the main routing directive, but do not mention anything about *incrementing* a distance component for a current segment of a *return routing directive*. Nor does the cited portion of Nugent mention anything about adding a new segment to a *return routing directive* so that the new segment becomes the current segment of the return routing directive. Instead, the cited portion of Nugent describes only how Nugent's system uses a forward routing directive (e.g. describing a route between a source and a destination).

Thus, the Examiner has failed to cite any portion of any cited art that describes incrementally encoding a return routing directive that includes incrementing the distance component for a current segment of the return routing directive and wherein, if after said

decrementing the distance component for the current segment of the routing directive is zero, the method further comprises modifying the direction component of a current segment of the return routing directive and adding a new segment to the return routing directive so that the new segment becomes the current segment of the return routing directive when the message is sent on the selected output port. Furthermore, since Flaig and Walker, whether considered singly or in combination, fail to overcome the above noted deficiencies of Nugent, the Examiner's combination of Flaig, Walker and Nugent fails to teach or suggest the limitations of claim 63.

Additionally, regarding claim 63, the Examiner contends that it would have been obvious to a person of ordinary skill in the art to employ the teachings of Nugent within the system of Annapareddy. However, Annapareddy is not relied upon by the Examiner in the rejection of claim 63. Applicants assume the Examiner intended to provide a motivation to combine the teachings of Nugent with those of Flaig and Walker. Regardless, the Examiner's stated motivation, namely "because by decrementing the directional component to zero allows directional limits to be set thereby triggering a change in directions such as from x-direction to Y or Z-direction" merely describes features already in the system of Flaig. No one looking to provide directional limits by decrementing a directional component to zero would not have to modify Flaig, as Flaig already teaches such functionality, and thus would not be motivated to incorporate the teachings of Nugent. Thus, the Examiner has failed to provide a proper motivation to combine the teachings of Nugent with those of Flaig and Walker.

In response to Applicant's previous arguments, the Examiner states that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. However, in the previous response, Applicants specifically stated, "Flaig in view of Walker does not teach or suggest" the limitations of claim 63 (the Examiner did not previously rely upon Nugent in the rejection of claim 63). Furthermore, to the extent that Applicant referred to individual references, it was to show that the Examiner's reliance on those individual references to teach a specific limitation of the claim in question was erroneous.

Therefore, for at least the reasons presented above, the rejection of claim 63 is not supported by the prior art and removal thereof is respectfully requested. Similar remarks as those discussed above with regard to claim 63 apply also to claim 66.

Regarding claim 65, Flaig in view of Walker in further view of Nugent, fails to teach or suggest wherein the return routing directive further comprises a pointer to the current segment wherein adding a new segment to the return routing directive comprises moving the pointer to the new segment. The Examiner cites Flaig, column 11, lines 12-13. However, the cited passage discusses the use cycle-stealing DMA to transfer packets between Flaig's router and memory and the use of an address pointer to read and write data in DRAM. The cited passage does not mention anything about a return routing directive, or about adding a new segment to a return routing directive including move a pointer to a new segment of the return routing directive. Neither Walker nor Nugent overcome this deficiency of Flaig. Thus, the rejection of claim 65 is not supported by the prior art and removal thereof is respectfully requested.

The Examiner rejected claim 71 under 35 U.S.C. § 103(a) as being unpatentable over Flaig in view of Brantley, Jr. et al. (U.S. Patent 4,980,822) (hereinafter "Brantley"). Applicants respectfully traverse this rejection for at least the following reasons.

In regard to claim 71, Flaig in view of Brantley does not teach or suggest a storage system comprising a plurality of nodes wherein different ones of said plurality of nodes perform different functions in the storage system, wherein each one of a first portion of said plurality of nodes are storage nodes each comprising at least one mass storage device, and wherein each one of a second portion of said plurality of nodes is a host interface node configured to provide an interface for the storage system to a host computer. The Examiner admits that these limitations are not taught by Flaig. The Examiner relies on Brantley. However, Brantley describes a multiprocessing system in which all of the nodes are identical, as shown in FIGs. 1 & 2. See also, Brantley – col. 4,

lines 30-59. Thus, Brantley clearly does not suggest a storage system comprising a plurality of nodes wherein different ones of said plurality of nodes perform different functions in the storage system. Moreover, routing systems such as described in Flaig and Brantley have generally been used in systems which route communication among a plurality of identical nodes, such as the homogenous multiprocessing nodes of the systems in Flaig and Brantley. The prior art does not suggest using these types of networks in heterogeneous systems where different ones of the nodes perform different functions.

In the Response to Arguments section, the Examiner contends that "different ones of said plurality of node perform different functions in the storage system," is subjective and not a limitation "particularly pointing out" or "distinctly claiming" the invention. The Examiner states, "clearly a node inherently performs a function. What functions the node performs without specifically claiming the particular function is not a limitation within the claim language and therefore subjective." The Examiner is incorrect. Claim 71 clearly and precisely recites a storage system comprising a plurality of nodes, wherein different ones of the plurality of nodes perform different functions in the storage system. Claim 71 further recites that each one a first portion of the plurality of the nodes is a storage node comprising at least one mass storage device and that each one of a second portion of the plurality of nodes is a host interface node configured to provide an interface for the storage system to a host computer. Thus, rather than simply reciting that a node performs a function, as suggested by the Examiner, claim 71, particularly describes the configuration of a storage system that includes a plurality of nodes and further describes a particular relationship among those nodes.

Moreover, the Examiner's opinion that the limitation of claim 71 regarding whether different ones of the plurality of nodes performing different functions is subjective is not a proper basis for rejection. The Examiner must provide prior art that teaches the claim limitation and a proper motivation to combine the references. As noted above, routing systems such as described in Flaig and Brantley have generally been used in systems which route communication among a plurality of identical nodes, such as the

homogenous multiprocessing nodes of the systems in Flaig and Brantley. Thus, the cited art is directly in contrast with claim 71 which recites that "different ones of the plurality of nodes perform different functions in the storage system" including "mass storage" and "host interface." The Examiner has failed to cite any prior art references that, whether considered singly or in combination, teach or suggest a storage system including a plurality of nodes, wherein different ones of the plurality of nodes perform different functions in the storage system. Instead, the Examiner's combination of Flaig and Brantley results in a system that includes identical nodes, each of which perform the same functions as every other node.

Furthermore, the cited art does not teach or suggest where each one of a first portion of the plurality of nodes are storage nodes each comprising at least one mass storage device. The Examiner cites the abstract and FIG. 2 of Brantley referring to Brantley's "associated memory module" and main store 30. However, the "associate memory module" and the main store of each node in Brantley is the processor memory, not a mass storage device. Brantley repeatedly refers to the main store 30 as a memory module. A memory module is clearly very different from a mass storage device, as mass storage devices are understood in the art. Nowhere does Brantley describe main store 30 as a mass storage device.

As Flaig does not overcome any of the above-mentioned deficiencies of Brantley, the Examiner's combination of Flaig and Brantley fails to teach or suggest a storage system comprising a plurality of nodes wherein different ones of said plurality of nodes perform different functions in the storage system, wherein each one of a first portion of said plurality of nodes are storage nodes each comprising at least one mass storage device, and wherein each one of a second portion of said plurality of nodes is a host interface node configured to provide an interface for the storage system to a host computer.

For at least the reasons above the rejection of claim 71 is not supported by the prior art and removal thereof is respectfully requested.

The Examiner rejections claims 14 and 15 as being unpatentable over Annapareddy in view of Walker and Nugent. Applicant assumes that the Examiner meant to include claims 14 and 15, not claims 10-13, 33-35, and 47-52, as stated in item 9 - rejection under 35 U.S.C. 103(a) as being unpatentable over Annapareddy et al. (US 5,602, 839 A) in view of Walker et al. (US 5,613,069 A) and Nugent (US 5,175,733 A). The Examiner also rejected claims 36 and 40 as being unpatentable over Annapareddy in view of Otterness et al. (U.S. Patent 6,792,472) (hereinafter "Otterness"). Applicants respectfully traverse the rejection of claims 14, 15, 36 and 40 for at least the reasons presented above regarding their respective independent claims.

In regard to the rejections under both § 102 and § 103, Applicant asserts that numerous other ones of the dependent claims recite further distinctions over the cited art. However, since the rejection of the independent claims is unsupported by the prior art, as discussed above, a further discussion of the dependent claims is not necessary at this time.

CONCLUSION

Applicants submit the application is in condition for allowance, and an early notice to that effect is requested.

If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5181-68300/RCK.

Also enclosed herewith are the following items:

☒ Return Receipt Postcard

☐ Petition for Extension of Time

☐ Notice of Change of Address

☐ Other:

Respectfully submitted,

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